Work Statement

Edge Measurement Standardization Program

Object

To develop and validate a procedure for applying microdensitometer edge trace analysis to estimating the technical quality of aerial photography. The method should be suitable for routine production using automated procedures.

Organization

A working team headed by a chairman shall be organized to carry out the work. The chairman should be a scientist of recognized professional reputation in the field of photographic measurement. This team shall be made up of representatives of industrial and Government laboratories actively engaged in edge measurement and data reduction. A joint experimental program will be carried out by team members working in their individual laboratories. The team shall meet regularly both to plan the technical work and review the results obtained. The program will be periodically revised based on results, so as to reject as quickly as possible those methods of limited promise and to arrive expeditiously at agreed upon procedures. While the work should proceed with a certain sense of urgency, no compromise should be made with the requirement for a truly scientific approach to the problem. The program should be unclassified.

Task Outline

Phase I - Planning

1. Conduct a review of work carried out to date both published and unpublished.

2. Review and analyse the characteristics of microdensitometers available to team members as well as other commercially available instruments considered suitable for edge analysis.

Phase II - Laboratory Edges

1. Specify and prepare sample edges for circulation among members. The edges must be prepared by calibrated image forming systems with a variety of known transfer functions. Emphasis should be placed on [redacted] but a second [redacted] should be included for comparison.

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2. Circulate sample edges among laboratories for measurement and data reduction in accordance with the procedure or procedures preferred by each

laboratory. Edge trace data obtained by laboratories should be circulated so that the data reduction techniques used by other laboratories can be applied.

3. Following this, and guided by a review of the results of the first circulation, to recommend modifications of technique as needed and repeat the experiment. This procedure should be continued until a consensus is achieved on proper procedure.

4. Evaluation of results must at all times be guided by appropriate statistical measures of systematic and random errors.

5. Techniques should be rejected that are not susceptible to application by trained technicians in a routine way.

Phase III - Operational Edges

1. Apply the techniques approved in Phase I to edges in actual aerial photographs.

2. Analyse these results statistically in order to determine the accuracy and reliability possible under different conditions.

3. Outlines procedures necessary to ensure the selection of edges (density, straightness, sharpness, etc.) suitable for measurement.

Report

The team shall prepare a report which (a) describes the work carried out by the team, (b) recommends techniques and procedures and (c) describes the accuracy and reliability possible in measurements up to levels at least corresponding to [redacted] lines/mm at 2:1 contrast. STAT

The report will include a discussion of the errors introduced as a function of instrumentation, procedure and resolution level, thus providing firm guide lines which will govern the long-term routine application and interpretation of edge trace data.